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Focus Farm Updates

There's been a lot happening at the four climate change focus farms since our last newsletter. Here's a selection of topics we've been exploring to help farmers

benefit the farm business **and** reduce the farm carbon footprint. .

Cash savings at Stewart Tower

With help from SAC's Sinclair Simpson, Neil and Linsey Butler have identified a number of financial and efficiency savings that could be achieved over the year. These include

- A move towards grass/clover swards for silage. In 2011, first cuts receiving an application of 38kg/ha N and second cuts receiving an application of 25kg/ha N matched the yields of previous timothy/ryegrass swards treated with 190kg/ha of nitrogen over two cuts.
- In 2012 no nitrogen will be applied to a strip in each field to evaluate the production from low level nitrogen application compared to zero nitrogen.
- Fertiliser planning for the spring cereal crop takes account of soil analysis and applications of manure. Where 25t/ha of manure is applied in February to lighter fields with moderate phosphate and potash status, compound fertiliser is cut by 220kg/ha on lighter land and by 125kg/ha on heavier land, with no yield penalty.
- Selection for disease resistant high yielding spring barleys has allowed for satisfactory yields from a single fungicide application in a dry year when disease pressure is low.



Sinclair (centre) estimated that a saving on fuel costs of around £1,500/year was achievable. Added to savings in fertiliser and pesticide costs, that could mean a **saving of £10,500/year** over a 173 ha farm with no loss of business output whilst taking a step toward reducing emissions implicated in climate change.

From Cow to Cone - Stewart Tower family farm walks

Following October's wet family farm walk at Stewart Tower, farmers Neil and Linsey Butler volunteered to do it all again, this time with the theme 'From Cow to Cone'.



Visitors were invited to take a walk around the farm as Sinclair and Neil explained how grass, with a bit of help from the cows, can lead to the award winning Stewart Tower Ice Cream.

During the walk, Neil and Sinclair highlighted things farmers had to consider to maintain a healthy and productive business, whilst lowering their carbon footprint. There were ideas about how visitors could tweak some of the steps to use at home. An insight into the valuable role of clover saved one couple a trip to B&Q, as they vowed to encourage clover in their lawn.

A number of visitors commented on the walk being a good opportunity to take

children onto a working farm to see where their food comes from.



SAC's Sinclair Simpson talks to families during the farm walks

Maximising the value of farm yard manure at Upper Nisbet

Optimising fertiliser and manure application has been one of the first areas considered at the arable climate change focus farm, Upper Nisbet near Jedburgh, run by Robert and Jac Neill.

With increasing fertiliser costs, making best use of farm yard manure (FYM) has become even more important to farm profitability. Upper Nisbet's FYM was sampled and analysed to measure the levels of nitrogen (N), phosphate (P) and potash (K). The results are shown in the table below:

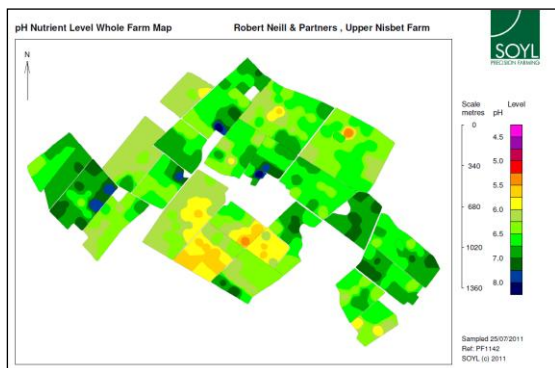
Upper Nisbet Cattle FYM 2011

Nutrient	Value/tonne
Total nitrogen (kg N/t)	7.7
Available nitrogen (kg N/t)	1.54
Total phosphate (kg P ₂ O ₅ /t)	3.2
Available phosphate (kg P ₂ O ₅ /t)	1.92
Total potash(kg K ₂ O/t)	7.6
Available potash(kg K ₂ O/t)	6.84

The readily available levels of N, P and K were used to estimate the nutrients available to the next crop (winter barley). As the winter barley fields had a moderate

P & K soil status, the dressing of FYM would supply all the crop phosphate and potash requirements, plus build up potash reserves.

Regular soil sampling has taken place at Upper Nisbet since the Neill's took over the farm in 2000. At the time information was needed to base remedial applications of lime, P and K. Last summer for the first time the fields were grid mapped for pH, P K and magnesium (Mg).



Soil pH status at Upper Nisbet

Soil mapping involves taking a greater number of soil samples across a field. The position of each sample point is recorded using GPS equipment; the resulting map can then be downloaded to any tractor GPS system. The aim is to give more precision to fertiliser applications, applying more where nutrient levels are low to ensure yield is maximised and where nutrient levels are high, less or no fertiliser can be used.

So far, this season's lime has been spread by a contractor using a variable rate spreader and a download of the soil mapping information. Savings have been made in lime but it is too early to say how much.

This demonstrates that even on well managed and forward thinking farms, there are still opportunities to improve farm profitability. This approach also goes hand in hand with reducing emissions from the current system, through more targeted application of nutrients.

For those farmers wanting to take steps towards better nutrient management but

perhaps don't want to go straight into GPS and precision fertiliser applications, computer programmes such as [Manner](#) and [PLANET Scotland](#) provide useful tools to make sure you are getting the best from slurry and manures on the farm.

The 'SatNav for Soils' podcast looking at precision fertiliser application can be downloaded [here](#).

Renewable heat in action

Renewable Heat Incentive (RHI) has made wood fuel a more attractive option for farm businesses with a demand for heat.

The Upper Nisbet discussion group recently visited a wood fuel boiler in action at Floors Castle by kind permission of the Roxburghe Estate. Host Peter Darling, showed the group the Austrian Köb Pyrtec 720kW biomass boiler, supplying heat to the castle and farm cottages, plus plant nursery and coffee shop.



Woodchip boiler at Floors Castle. Hot water accumulator tanks far right. Silver wheeled skip for ash removal.

The boiler burns around 450 tonnes of wood chip per year to heat water which is stored in two 3000 litre insulated accumulator tanks. Hot water is piped underground on demand with surprisingly little heat loss.

With an automated self feed auger to load the chips from the adjacent hopper and a walking floor system to remove ash into a metal wheeled skip the Köb boiler needs little to no supervision bar a daily check.

Peter noted that if the boiler does need attention, it's usually due to issues with the computer or electrical systems.

The Estate sawmill produced chip from low value, soft wood clear fell timber and thinnings.



Chipper in action at the Estate sawmill

Drying timber requires a windy site with the prevailing wind blowing through the woodpile. The Köb boiler can deal with wood at around 40% moisture content or below. For smaller boilers, lower moisture content of around 28-30% would be desirable.

Yes the system at Floors Castle is big, but most of the key points can easily apply at the farm scale. Advantages include:

- Reduced oil cost
- Reduced exposure to oil price fluctuations
- Reduced carbon footprint for the business
- Home supply of fuel plus fuel to sell
- Improved woodland management
- Increased returns on timber
- Long term work for contractors

There is more information on Upper Nisbet and the notes from meetings held to date [here](#).

Managing farm woodlands for fuel at Torr

The subject of woodland management and the RHI was also explored at the Torr focus farm discussion group meeting. With around 45ha of mixed woodland at Torr, farmer Ross Paton was keen to hear

from Patrick Higgins (Scottish Woodlands) how he could develop a rotation to supply wood fuel and opportunities for sale or home use.

Although you don't need much more than a chainsaw to process firewood, machinery can make for a much quicker and easier job. Jas P Wilson supplied a wood fuel processor, a splitter and a saw bench for demonstration.



Wood fuel demonstration courtesy of Jas P Wilson

SAC's Biomass and Energy Specialist Kate Hutchinson explained the key features of the current RHI scheme and noted the importance of matching your circumstances with the technology, as there are numerous pro's and cons of log, woodchip and wood pellet boilers.

Steve Jones from Brockloch Firewood was on hand to talk about his experiences of wood fuel, his 35kW woodchip boiler system and why he chose chips and not logs or pellets.

Wood fuel and climate change

Burning wood releases less harmful greenhouse gases than burning coal or gas per kWh of energy produced. Using wood fuel from well managed sources can reduce demand for fossil fuels. Wood fuel could encourage more tree planting and active management of woodlands plus provide a fuel source or additional income for the farm business.

Torr's Micro Hydro 'away day'

Focus farmers Ross and Lee Paton had a bit of a break from acting as hosts when

the Torr discussion group visited Kath and Matthew Aitken at Auchenage near Auldgirth and Neil and Mary Gourlay at Auchencheyne near Moniaive recently.

Kath and Matthew operate a 9kW turgo turbine to take advantage of a mean flow rate of around 40litres/second on their hill burn. Kath talked through the process in the pump house and then took the group to walk the 680m penstock route to the intake screen further up the hill.

Although it took around 18 months to obtain planning consents and required a range of ecological studies before permission was granted, Kath concluded it was a worthwhile exercise and was pleased with the operation, returns and low maintenance requirements.

Guest speaker, Joe Fergusson from The Energy Agency outlined a range of other renewable technologies suited to farm use.

At Auchencheyne, Neil Gourlay has two micro hydro schemes on his land; an 11kW system fed from a reinstated Victorian lake and a 12kW system fed by a hill tributary at the home farm. Although costing around £70,000, an attractive three year payback period makes this an excellent investment for the farm. Utilising energy from micro hydro has also cut oil bills in the farmhouse from £5,000 to nearer £2,000 per year.



Farmers hear about range of renewables from The Energy Agency guest speaker Joe Fergusson.

Improving livestock productivity

SAC's David Keiley and Rhidian Jones explored some of the small changes that could lead towards improved productivity of both dairy and beef herds.



Torr calves

David and Rhidian discussed a range of topics from cow comfort and dairy cow housing, to feed supply, demand and planning for stores and finishers. By improving on farm efficiencies you are making better use of resources, being more cost efficient and in turn, reducing the farm carbon footprint.

There is more detailed information on this and the other meetings held Torr [here](#).

Maximising sheep output at Glenkilrie

Glenkilrie is an upland beef and sheep farm near Blairgowrie, run by David and Morag Houstoun, with around 330 cross ewes and 740 hill ewes split into two different flocks.

John Vipond, SAC Sheep Specialist, highlighted that making the best use of low cost, home grown silage is a key step towards improving feed efficiency. The meeting was packed with facts and figures; other ideas discussed included a change in feeding regime, grazing management, knowing silage quality and amount available, cutting waste and use of body reserves to save supplementary feed in late pregnancy.

John's advice is summarised in the Maximising Sheep Output meeting notes [here](#).

Glenkilrie group visits 'GreenCow'

The Glenkilrie discussion group recently visited SAC's "GreenCow" research facility outside Edinburgh. The research facility is helping the industry answer questions about livestock emissions and aims to provide benchmark emission figures for different types of livestock.

Visitors heard from SAC's Beef Specialist Jimmy Hyslop about how some of the research could already benefit farms, but farmers should not get too hung up on the climate change targets. In short, **measures which reduce the loss of greenhouse gases also tend to improve the efficiency of production and visa versa.**

SAC researcher John Rooke dispelled the popular misconception that the majority of methane comes from the back end of the cow; over 90% of methane from the cow is released as burps (or to give it its technical term 'eructation').

Feed bunkers in the cattle courts allow methane produced by individual animals as they feed to be measured, as well as recording how much food is consumed. Cameras are in place to record movement; un-stressed animals which move about less are more efficient, using the energy for growth and not motion.

The facility has six state-of-the-art methane or respiration chambers. Individual animals are housed in the chambers for three or four days and gases produce are collected and recorded.

Trials were underway while the group was visiting, comparing forage and cereal based diets and the amount of methane produced from each. Much of the work is aimed at providing basic data on the amount of methane produced by livestock.

The GreenCow visit summarised that whatever the system, it still needs to be run efficiently. Quality Meat Scotland (QMS) benchmark figures show that the top third performing businesses of any system also have the lowest carbon footprint. This is usually because these businesses sell more animals (lower losses), generally at heavier weights and often quicker and using less concentrates.



Respiration chambers

For an overview of Glenkilrie and more detailed information on the findings from farmer meetings, click [here](#)

Carbon footprinting

A carbon footprint is basically a way of looking at how much greenhouse gas your business or an individual product from your business produces. These greenhouse gases can be looked at as a waste; reducing waste will improve profitability. For farmers, grassland management, rations and fertility can all help to improve livestock profitability and in turn, cut the carbon footprint. Practical guides on cutting the carbon footprint from the beef and dairy herd can be found [here](#).

Minimising the 'three Fs'

Fuel, feed and fertiliser are not getting any cheaper. Hargrove Farm near Carrutherstown in Dumfries and Galloway kindly hosted a meeting focusing on these three topics and opportunities for savings.

Feed and fertiliser use were covered in detail by SAC's Jimmy Goldie and Hugh McClymont respectively. Here SAC's Jim Campbell outlines some of the key electricity savings possible in the parlour at Hardgrove:

- Using borehole water to feed a plate cooler could cut milk temperature by about 20degC, representing a saving of about £2,400 per year.
- Installing a new plate cooler could cost approximately £2,000 with a payback of around three years.
- Water used for washing down the dairy and parlour is kept to a minimum. Reducing the amount of water going into the slurry system can cut pumping / spreading requirements.
- A variable speed milk pump would aid efficiency of the heat exchange. Retrofitting could cost around £2,500 to £3,000 giving a payback of around five years.
- Make the best use of heated water; use one hot wash per day and one cold wash if feasible.

Taking a second look at all three aspects could lead to significant savings for the farm and lower the farm carbon footprint.

Top tips for cutting farm fuel use

Upper Sauchen Farm near Huntly kindly invited farmers along to look at ways to improve efficiency. Organised by SAC's Ewan Johnston, Machinery Specialist Tom Robertson was one of the invited speakers and provided some tips to reduce fuel use:

- 1. Match tractor size to the job in hand**
Bigger tractors will use more fuel; could the same job be done just as well with a smaller machine? High powered tractors are now commonplace on the farm and are used for a range of light work during the year. If you can, use a smaller tractor for light work to cut unnecessary fuel use.
- 2. Consider reduced tillage**
Although not suitable for all land, reduced tillage techniques can cut fuel use. For example, ploughing, cultivating and sowing can use around 60 litres diesel per hectare; direct drilling can cut this down to around 12 litres. Min till would be about half way between these two figures, again depending on the system used.



Where possible, match tractor to job in hand

3. Check you have the right size of tyre at the correct pressure

All tyres have a recommended pressure for different working speeds; tyre pressure can make a big impact on fuel usage. Bigger tyres can be worked at lower pressures, meaning less soil damage through ruts and compaction and better fuel efficiency through less slip and less rolling resistance climbing out of ruts.

4. Keep on top of tractor maintenance

A dirty air cleaner can reduce power output by 30% or more, as injected fuel can't be burned properly. Fuel contaminated with dirt or water will damage high pressure fuel pumps and injectors, again leading to higher fuel consumption, lower power output and increased maintenance costs.

5. Fuel storage

Check the fuel storage tank, as most new tanks with transfer pumps also have a filter in the system. Biofuels can make fuel more susceptible to attack from bacteria, forming a thick sludge. This can be an issue for combines in storage but fuel treatment systems can be used to prevent problems arising.

What are you 'Twittering' about?

We do have the occasional tweet now and again. You can keep up to date with the project by following us on Twitter at SACFarm4Climate



What is FFBC?

With Scottish Government funding and support from NFUS, SAC are running the Farming for a Better Climate (FFBC) initiative to help farmers identify practical steps to reduce farm emissions linked to climate change.

The key to reducing these greenhouse gas emissions is **improved efficiency**, which is also vital for a sustainable and profitable business. **Demonstrating that farmers are taking action now could offset future regulations.**

For a reminder of the Farming for a Better Climate initiative and 5 Key Action Areas, plus profiles of the Climate Change Focus Farms, Practical Guides and Case Studies, take a look at www.farmingforabetterclimate.org

Come to the next meeting

Discussion group meetings cover practical farming topics with specialist guest speakers. Meetings are free and all farmers are welcome to attend. Contact climatechange@sac.co.uk or the local farm facilitator using the details opposite.



Torr Discussion group meeting looking at soil quality

Getting in touch

What would you like to see covered in future newsletters? Are you already taking steps to mitigate or adapt to climate change? We would love to hear from you.

You can send a general enquiry to climatechange@sac.co.uk or contact one of the team:

- Project Coordinator — Rebecca Audsley, SAC Auchincruive Office. Email rebecca.audsley@sac.co.uk Tel 01292 525089
- **Glenkilrie** Focus Farm Facilitator — Peter Lindsay, SAC Perth Office. Email peter.lindsay@sac.co.uk Tel 01738 636611
- **Stewart Tower** Focus Farm Facilitator — Sinclair Simpson, SAC Perth Office. Email Sinclair.simpson@sac.co.uk Tel 01738 636611
- **Torr** Focus Farm Facilitator — David Keiley/Gillian Reid, SAC Dumfries Office. Email Gillian.reid@sac.co.uk or David Keiley@sac.co.uk Tel 01387 261172
- **Upper Nisbet** Focus Farm Facilitator — Moira Gallagher, SAC St Boswells Office. Email moira.gallagher@sac.co.uk Tel 01835 823 322

In the next edition of FFBC news...

We will include more examples of practical steps farmers are considering to further improve farm efficiency and reduce emissions.

If you would like to be notified when the next newsletter is out, email climatechange@sac.co.uk and ask to be added to the mailing list. Your email details won't be shared with anyone else.

